

**WHAT IS CLAIMED IS:**

- 1           1. A method of changing the permeabilities of
- 2    tubular wrappers of rod-shaped products of the tobacco
- 3    processing industry, comprising the step of simultane-
- 4    ously changing the permeabilities of wrappers of a
- 5    plurality of products.

1           2. The method of claim 1, wherein said step  
2 includes perforating the wrappers of  $\underline{n} \geq 2$  products,  
3  $\underline{n}$  being a natural number.

1           3. The method of claim 2, wherein said  
2 perforating step includes establishing a source of  $\underline{n}$  at  
3 least substantially parallel laser beams, and directing  
4 the  $\underline{n}$  beams upon  $\underline{n} - \underline{x}$  oscillatable beam reflecting  
5 mirrors to focus the  $\underline{n}$  beams upon the wrapper of at  
6 least one product,  $\underline{x}$  being a natural number less than  
7  $\underline{n}$ .

1           4. The method of claim 3, wherein  $\underline{n}$  equals two.

1           5. The method of claim 3, further comprising the  
2 step of moving the products in the course of said chang-  
3 ing step and oscillating each mirror to thus focus the  
4 beams upon the wrappers of moving products.

1           6. The method of claim 5, wherein  $\underline{n}$  equals two.

1           7. The method of claim 2, wherein said changing  
2 step includes simultaneously perforating m selected  
3 portions of the wrapper of each product.

1           8. The method of claim 7, wherein m  $\geq$  2 and is  
2 a natural number.

1           9. The method of claim 8, wherein said perforat-  
2 ing step includes directing m substantially parallel  
3 pulsating laser beams upon the wrapper of each product.

1           10. The method of claim 9, wherein said  
2 perforating step includes simultaneously directing p  
3 laser beams upon q partially reflecting mirrors to  
4 reflect a first portion and to permit passage of a  
5 second portion of each laser beam, and directing  
6 the second portions of the laser beams against at least  
7 one fully reflecting mirror, m being equal to  $p(q + 1)$   
8 wherein p is a natural number and q is a natural number  
9 including zero.

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1 11. A device for changing the permeabilities of  
2 tubular wrappers of a series of at least substantially  
3 equidistant rod-shaped products, comprising:

4 means for emitting n laser beams; and

5 means for simultaneously directing the laser beams  
6 upon the wrappers of n products, n being a natural num-  
7 ber greater than one and said directing means including  
8 n - x movable mirrors arranged to deflect a plurality  
9 of beams making an acute angle the magnitude of which  
10 is a function of the distance between neighboring  
11 products of said series, x being a natural number less  
12 than n.

1           12. The device of claim 11, further comprising  
2 means for moving the products of the series along a  
3 predetermined path and means for oscillating each mirror  
4 to thus focus the beams upon the wrappers of selected  
5 products in said path.

1           13. The device of claim 12, wherein said  
2 directing means includes means for simultaneously fo-  
3 cussing at least one discrete beam upon each of m  
4 different portions of the wrapper of each of the series  
5 of products in said path, m being a natural number ex-  
6 ceeding one.

1           14. The device of claim 13, wherein said oscillat-  
2 ing means includes means for oscillating the n - x  
3 mirrors about a common axis.

1           15. The device of claim 11, wherein said mirrors  
2 include  $q = (m/p) - 1$  partially transmitting mirrors  
3 arranged to split each of  $p$  incident beams into a  
4 reflected first portion and a transmitted second  
5 portion, and at least one fully reflecting mirror for  
6 said second portions of the beams,  $p$  being a natural  
7 number and  $q$  being a natural number including zero.

01.31.2001

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1           16. Apparatus for treating smokers' products of  
2 the type wherein a rod-shaped component is surrounded  
3 by a tubular wrapper carrying a deformable strip, com-  
4 prising:

5           a rolling unit having a plurality of surfaces  
6 defining a channel and including at least one first  
7 surface which moves relative to at least one second  
8 surface, said channel having an inlet and an outlet;

9           means for feeding into said inlet successive  
10 products of a series of products having tubular wrappers  
11 each of which is contacted by the respective strip whe-  
12 reby the wrappers are caused to roll due to contact with  
13 said surfaces and to thus convolute the respective strips  
14 thereabout in said channel; and

15           means for changing the permeabilities of the  
16 wrappers during rolling in a predetermined portion of  
17 said channel, comprising means for simultaneously per-  
18 forating the wrappers of at least two products in said  
19 predetermined portion of said channel.

1           17. The apparatus of claim 16, wherein said  
2 channel includes an additional portion which is disposed  
3 at said inlet and the strips are convoluted around the  
4 respective wrappers in said additional portion of said  
5 channel, said predetermined portion of said channel im-  
6 mediately following said additional portion, as seen in  
7 a direction from said inlet toward said outlet, said  
8 perforating means being arranged to change the permea-  
9 bilities of the wrappers of products at least in said  
10 predetermined portion of said channel.

1           18. The apparatus of claim 17, wherein said  
2 perforating means is constructed and arranged to start  
3 the perforating of wrappers in said additional portion  
4 of said channel.

1           19. The apparatus of claim 16, wherein at least  
2 a portion of said channel has an arcuate shape.



1           20.   The apparatus of claim 16, wherein said  
2   rolling unit comprises a rotary conveyor having a  
3   cylindrical peripheral surface constituting said at  
4   least one first surface, and a stationary rolling member  
5   having a concave surface concentric with and spaced  
6   apart from said peripheral surface and constituting said  
7   at least one second surface.